SEQUENCE LISTING

<110> Chan, Chung
Zamost, Bruce L.
Covert, Douglas C.
Liu, Hong Y.
De Jongh, Karen S.
Meyer, Jeffrey D.
Holderman, Susan D.

<120> IL-21 PRODUCTION IN PROKARYOTIC HOSTS

<130> 02-12

<160> 42

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 642
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (47)...(535)

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agt cct ggc aac atg gag agg att gtc atc tgt ctg atg gtc atc ttc   103
Ser Pro Gly Asn Met Glu Arg Ile Val Ile Cys Leu Met Val Ile Phe
     5                  10                  15

ttg ggg aca ctg gtc cac aaa tca agc tcc caa ggt caa gat cgc cac   151
Leu Gly Thr Leu Val His Lys Ser Ser Ser Gln Gly Gln Asp Arg His
 20                  25                  30                  35

atg att aga atg cgt caa ctt ata gat att gtt gat cag ctg aaa aat   199
Met Ile Arg Met Arg Gln Leu Ile Asp Ile Val Asp Gln Leu Lys Asn
                 40                  45                  50
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tat gtg aat gac ttg gtc cct gaa ttt ctg cca gct cca gaa gat gta   247
Tyr Val Asn Asp Leu Val Pro Glu Phe Leu Pro Ala Pro Glu Asp Val
            55                  60                  65

gag aca aac tgt gag tgg tca gct ttt tcc tgt ttt cag aag gcc caa   295
Glu Thr Asn Cys Glu Trp Ser Ala Phe Ser Cys Phe Gln Lys Ala Gln
        70                  75                  80

cta aag tca gca aat aca gga aac aat gaa agg ata atc aat gta tca   343
Leu Lys Ser Ala Asn Thr Gly Asn Asn Glu Arg Ile Ile Asn Val Ser
    85                  90                  95

att aaa aag ctg aag agg aaa cca cct tcc aca aat gca ggg aga aga   391
Ile Lys Lys Leu Lys Arg Lys Pro Pro Ser Thr Asn Ala Gly Arg Arg
100                 105                 110                 115

cag aaa cac aga cta aca tgc cct tca tgt gat tct tat gag aaa aaa   439
Gln Lys His Arg Leu Thr Cys Pro Ser Cys Asp Ser Tyr Glu Lys Lys
                120                 125                 130

cca ccc aaa gaa ttc cta gaa aga ttc aaa tca ctt ctc caa aag atg   487
Pro Pro Lys Glu Phe Leu Glu Arg Phe Lys Ser Leu Leu Gln Lys Met
            135                 140                 145

att cat cag cat ctg tcc tct aga aca cac gga agt gaa gat tcc tga   535
Ile His Gln His Leu Ser Ser Arg Thr His Gly Ser Glu Asp Ser  *
        150                 155                 160

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ctttgtattc caagtggagg agccctatta aattatataa agaaata               642

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Val Ile Phe Leu Gly Thr Leu Val His Lys Ser Ser Ser Gln Gly Gln
            20                  25                  30
Asp Arg His Met Ile Arg Met Arg Gln Leu Ile Asp Ile Val Asp Gln
        35                  40                  45
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Leu Lys Asn Tyr Val Asn Asp Leu Val Pro Glu Phe Leu Pro Ala Pro
    50                  55                  60
Glu Asp Val Glu Thr Asn Cys Glu Trp Ser Ala Phe Ser Cys Phe Gln
65                  70                  75                  80
Lys Ala Gln Leu Lys Ser Ala Asn Thr Gly Asn Asn Glu Arg Ile Ile
                85                  90                  95
Asn Val Ser Ile Lys Lys Leu Lys Arg Lys Pro Pro Ser Thr Asn Ala
            100                 105                 110
Gly Arg Arg Gln Lys His Arg Leu Thr Cys Pro Ser Cys Asp Ser Tyr
        115                 120                 125
Glu Lys Lys Pro Pro Lys Glu Phe Leu Glu Arg Phe Lys Ser Leu Leu
    130                 135                 140
Gln Lys Met Ile His Gln His Leu Ser Ser Arg Thr His Gly Ser Glu
145                 150                 155                 160
Asp Ser
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<210> 3
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<213> oligonucleotide ZC29740Artificial Sequence

<220>
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<210> 4
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<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC29741

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<212> DNA

<213> Artificial Sequence

<220>
<223> oligonucleotide ZC29736

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cc 62

<210> 6
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<212> DNA
<213> Artificial Sequence

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ttc 63

<210> 7
<211> 62
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC29084

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tg 62

<210> 8
<211> 68
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<213> Artificial Sequence

<220>
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gtgttcta 68

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<210> 17
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<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22965

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<210> 18
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<212> DNA
<213> Artificial Sequence

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<223> oligonucleotide ZC22966

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<210> 20
<211> 60

<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22968

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<210> 21
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22969

<400> 21
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<210> 22
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22970

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<210> 23
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22971

<400> 23

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<210> 24
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22972

<400> 24
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<210> 25
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<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC40133

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ctg 63

<210> 26
<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC40107

<400> 26
ttatagatat tgttgatcag ctgaaaaatt atgtgaatga cctggttccg gaattcctgc 60
cggc 64

<210> 27
<211> 405
<212> DNA
<213> Artificial Sequence

<220>
<223> optimized IL-21

<221> CDS
<222> (1)...(405)

<400> 27

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 1               5                  10                  15

att gtt gat cag ctg aaa aat tat gtg aat gac ctg gtt ccg gaa ttc   96
Ile Val Asp Gln Leu Lys Asn Tyr Val Asn Asp Leu Val Pro Glu Phe
            20                  25                  30

ctg ccg gct ccg gaa gat gtt gag acc aac tgt gag tgg tcc gct ttc   144
Leu Pro Ala Pro Glu Asp Val Glu Thr Asn Cys Glu Trp Ser Ala Phe
        35                  40                  45

tcc tgt ttc cag aaa gcc cag ctg aaa tcc gca aac acc ggt aac aac   192
Ser Cys Phe Gln Lys Ala Gln Leu Lys Ser Ala Asn Thr Gly Asn Asn
    50                  55                  60

gaa cgt atc atc aac gtt tcc att aaa aaa ctg aaa cgt aaa ccg ccg   240
Glu Arg Ile Ile Asn Val Ser Ile Lys Lys Leu Lys Arg Lys Pro Pro
65                  70                  75                  80

tcc acc aac gca ggt cgt cgt cag aaa cac cgt ctg acc tgc ccg tcc   288
Ser Thr Asn Ala Gly Arg Arg Gln Lys His Arg Leu Thr Cys Pro Ser
                85                  90                  95

tgt gat tct tat gag aaa aaa ccg ccg aaa gaa ttc ctg gaa cgt ttc   336
Cys Asp Ser Tyr Glu Lys Lys Pro Pro Lys Glu Phe Leu Glu Arg Phe
            100                 105                 110

aaa tcc ctg ctg cag aaa atg att cac cag cac ctg tcc tct cgt acc   384
Lys Ser Leu Leu Gln Lys Met Ile His Gln His Leu Ser Ser Arg Thr
        115                 120                 125

cac ggt tcc gaa gat tcc tga                                      405
His Gly Ser Glu Asp Ser  *
    130
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<210> 28
<211> 134
<212> PRT
<213> Artificial Sequence

<220>
<223> optimized IL-21

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 1   5   10   15
Ile Val Asp Gln Leu Lys Asn Tyr Val Asn Asp Leu Val Pro Glu Phe
            20   25   30
Leu Pro Ala Pro Glu Asp Val Glu Thr Asn Cys Glu Trp Ser Ala Phe
        35   40   45
Ser Cys Phe Gln Lys Ala Gln Leu Lys Ser Ala Asn Thr Gly Asn Asn
    50   55   60
Glu Arg Ile Ile Asn Val Ser Ile Lys Lys Leu Lys Arg Lys Pro Pro
65   70   75   80
Ser Thr Asn Ala Gly Arg Arg Gln Lys His Arg Leu Thr Cys Pro Ser
                85   90   95
Cys Asp Ser Tyr Glu Lys Lys Pro Pro Lys Glu Phe Leu Glu Arg Phe
            100   105   110
Lys Ser Leu Leu Gln Lys Met Ile His Gln His Leu Ser Ser Arg Thr
        115   120   125
His Gly Ser Glu Asp Ser
    130

<210> 29
<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC43,586

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tgag   64

<210> 30

<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC43,587

<400> 30
tctgtatcag gctgaaaatc ttatctcatc cgccaaaaca tcatcgccat tgctccccaa 60
atac 64

<210> 31
<211> 1965
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA sequence of the Red Recombinase operon
amplified with ZC43,586 and ZC43,587

<400> 31
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tcgcgggcga tattttcaca gctatttcag gagttcagcc atgaacgctt attacattca 180
ggatcgtctt gaggctcaga gctgggcgcg tcactaccag cagctcgccc gtgaagagaa 240
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tgctcaccac caggttgata ttgattcaga ggtataaaac gaatgagtac tgcactcgca 480
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atcaccactc ttcgccagac ggcatttaaa ggtgatgcca gcgatgcgca gttcatcgca 600
ttactgatcg ttgccaacca gtacggcctt aatccgtgga cgaaagaaat ttacgccttt 660
cctgataagc agaatggcat cgttccggtg gtgggcgttg atggctggtc ccgcatcatc 720
aatgaaaacc agcagtttga tggcatggac tttgagcagg acaatgaatc ctgtacatgc 780
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gatgatgttt tggcggatga gataagattt tcagcctgat acaga 1965

<210> 32
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<212> DNA
<213> Artificial Sequence

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gttggcgttc tcaggtcgag gtggcccggc tc 92

<210> 33
<211> 99
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC45,171

<400> 33
taattgactc attaagttag atataaaaaa tacatattca atcattaaaa cgattgaatg 60
gagaactttt attattgaag catttatcag ggttattgt 99

<210> 34
<211> 1591
<212> DNA
<213> Artificial Sequence

<220>
<223> Tetracycline promoter::tetracycline gene

(tetp::tet) PCR fragment amplified with ZC45,112
and ZC45,171

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ggggaataac tagccatttc aatgtaacaa t 1591

<210> 35
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucletide ZC45,357

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<210> 36
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucletide ZC45,350

<400> 36
taattgttac attgaaatgg ctagttatt 29

<210> 37
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucletide ZC45,353

<400> 37
atgaaatcta acaatgcgct catcgtc 27

<210> 38
<211> 22
<212> DNA
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<220>
<223> oligonucletide ZC45,355

<400> 38
tcaggtcgag gtggcccggc tc 22

<210> 39
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<212> DNA
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<220>
<223> oligonucletide ZC45,354

<400> 39
tctaccgaga ctttatcgtt tactcct 27

<210> 40
<211> 28
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<220>
<223> oligonucletide ZC45,359

<400> 40
ttaaaatgtg tacttaagac cagcagta 28

<210> 41
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<212> DNA
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<220>
<223> Sequence of the 1584bp PCR fragment amplified with
primer set #1 (ZC45,357 and ZC45,350)

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ttagaaaaat aaacaaatag gggttccgcg cacatttccc cgaaaagtgc cacctgacgt 180
ctaagaaacc attattatca tgacattaac ctataaaaat aggcgtatca cgaggccttc 240
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<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence of the 1190bp PCR fragment amplified
with primer set #2 (ZC45,353 and ZC45,355)

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